

PCTWORLD INTELLECTUAL PI
Internation

INTERNATIONAL APPLICATION PUBLISHED UNI

WO 9606596A1

(51) International Patent Classification 6 : A61K 7/48, 7/06	A1	(11) International Publication Number: WO 96/06596
		(43) International Publication Date: 7 March 1996 (07.03.96)

(21) International Application Number: PCT/US95/10486

(22) International Filing Date: 16 August 1995 (16.08.95)

(30) Priority Data:
08/296,566 26 August 1994 (26.08.94) US(71) Applicant: THE PROCTER & GAMBLE COMPANY
[US/US]; One Procter & Gamble Plaza, Cincinnati, OH
45202 (US).(72) Inventors: FOWLER, Timothy, John; 7832-A Village Drive,
Cincinnati, OH 45242 (US). MCMANUS, Richard, Loren;
5393 Pinecastle Court, West Chester, OH 45069 (US).
DECKNER, George, Endel; 10572 Tanager Hills Drive,
Cincinnati, OH 45249 (US).(74) Agents: REED, T., David et al.; The Procter & Gamble
Company, 5299 Spring Grove Avenue, Cincinnati, OH
45217 (US).(81) Designated States: AM, AU, BB, BG, BR, BY, CA, CN, CZ,
EE, FI, GE, HU, IS, JP, KG, KP, KR, KZ, LK, LR, LT,
LV, MD, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG,
SI, SK, TJ, TM, TT, UA, UZ, VN, European patent (AT,
BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL,
PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD,
SZ, UG).**Published***With international search report.**Before the expiration of the time limit for amending the
claims and to be republished in the event of the receipt of
amendments.*

(54) Title: THICKENED NONABRASIVE PERSONAL CLEANSING COMPOSITIONS

(57) Abstract

The present invention relates to nonabrasive thickened aqueous-based personal cleansing compositions. These compositions utilize insoluble micronized cleansing particles of defined particle size that are not tactilely perceived by the user during the cleansing process, and yet which provide improved cleansing performance from the composition.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

THICKENED NONABRASIVE PERSONAL CLEANSING COMPOSITIONS

5

TECHNICAL FIELD

The present invention relates to nonabrasive personal care compositions in the form of aqueous-based gels which are useful for cleansing the skin and hair.

10 These compositions contain insoluble micronized cleansing particles chosen to provide a cleansing benefit, yet without being tactilely detectable by the user or unduly causing abrasion.

BACKGROUND OF THE INVENTION

Personal cleansing compositions must satisfy a number of criteria to be acceptable to consumers. These criteria include cleansing power, skin feel, mildness to the skin, hair, and ocular mucosae. Ideal personal cleansers should gently cleanse the skin or hair, causing little or no irritation and without leaving the skin overly dry or taut after frequent use.

15

One approach to personal cleansing is to utilize surfactants to aid in the removal of dirt, oil, and debris (e.g., make-up). However, with surfactant-based cleansing systems, a trade-off exists between mildness and cleansing and lathering ability. The most effective cleansing and lathering surfactants tend to be the harshest and most irritating. On the other hand, surfactants that are known to be mild tend to have the drawback of poor cleansing and lather performance compared to the highest bar soap standards (e.g., coconut soaps).

20

25 One solution to this problem has been to attempt to find a middle ground by balancing the surfactant system for mildness and cleansing and lathering ability.

Another approach to personal cleansing is to utilize solvents and emollients to aid in the removal of dirt, oil, and debris. Even though solvents and emollients are effective cleansers, these materials have the disadvantage of being more difficult to remove by rinsing and of tending to leave the skin with a coated, greasy feel. Also, most solvents and emollients have low water solubility which means that they must either be used in an anhydrous system or formulated with a high solvent level to provide effective cleansing.

30

Yet another approach to personal cleansing is to rely on the physical abrasion of suspended particles to remove oil, dirt, and other debris. A wide variety of cleansing compositions containing abrasive particles are known in the marketplace, but these compositions suffer from the disadvantage of giving an unpleasant sensation of scratchiness to the user, or even worse, of actually
5 damaging the skin by abrading it. In fact many abrasive scrub products are perceived as too harsh and irritating for everyday use.

Therefore, it is seen that conventional surfactant based cleansers, emollient and solvent cleansers, and cleansers utilizing abrasive particles all
10 suffer from disadvantages. Clearly, a need exists to develop personal cleansing compositions which provide effective skin cleansing benefits without the disadvantages of harsh surfactants, heavy emollients and solvents, and overly abrasive particles.

It has been surprisingly found in the present invention that highly
15 efficacious cleansing gel compositions can be prepared which utilize certain small diameter micronized particles to achieve improved cleansing efficacy. In these compositions the polymer particles are of such a size as to be below the tactile perception threshold of the user (i.e. the particles cannot be felt during the cleansing process). Without being limited by theory, it is believed that these
20 small particles are still large enough to physically provide a cleansing benefit by helping to lift away dirt, oil, and other debris. It has been found herein that polymeric particles having a mean particle size diameter from about 1 micron to about 75 microns are most useful for this purpose and permit the formulation of non-abrasive, non-irritating cleansing products, which are ideal for daily use. It
25 has also been found that particular attention must be given to ensuring that the particles employed do not have a significant percentage of particles above about 75 microns.

It is therefore an object of the present invention to provide non-abrasive personal cleansing compositions useful for cleansing the skin and hair.

30 It is another object of the present invention to provide personal cleansing compositions in the form of an aqueous gel utilizing insoluble micronized particles such that the compositions have good cleansing ability without irritating or abrading the skin.

It is another object of the present invention to provide a method for
35 cleansing the skin or hair.

These and other objects of this invention will become apparent in light of the following disclosure.

SUMMARY OF THE INVENTION

The present invention relates to a non-abrasive personal cleansing aqueous gel composition comprising:

- (a) from about 0.1% to about 20% of insoluble particles having a mean particle size diameter from about 1 micron to about 75 microns, with greater than about 95% of said particles in said composition having a diameter less than about 75 microns.
- (b) from about 0.05% to about 10% of a water soluble or dispersible gelling agent, and
- (d) from about 20% to about 99.85% water.

All percentages and ratios used herein are by weight of the total composition and all measurements made are at 25°C, unless otherwise designated. All weight percentages, unless otherwise indicated, are on an actives weight basis. The invention hereof can comprise, consist of, or consist essentially of, the essential as well as optional ingredients and components described herein.

DETAILED DESCRIPTION OF THE INVENTION

The personal cleansing compositions of the present invention are highly efficacious for cleansing the skin or hair without being irritating or abrasive or leaving the skin feeling greasy or coated. These cleansers can be prepared in a wide variety of viscosities ranging from slightly thickened liquids to semi-solid gels having a viscosity range from about 1 cps to about 1,000,000 cps, and beyond. These compositions can also be delivered from bottles, tubes, pumps, squeeze foamers, and aerosol containers as foams, mousses, and lathers.

The term "micronized", as used herein, means that the particles have a mean particle size diameter within about two orders of magnitude of a micron. In other words, the term as used herein, means that the particles can be defined in micron units without having to resort to unduly large or small exponential values.

The term "nonabrasive", as used herein, means that the compositions of the present invention do not have an abrasive or scratchy feel that is perceptible to the user.

The term "topical application", as used herein, means to apply or spread the compositions of the present invention to the surface of the skin or scalp and hair.

The term "pharmaceutically-acceptable", as used herein, means that the compositions or components thereof so described are suitable for use in contact with human tissue without undue toxicity, incompatibility, instability, allergic response, and the like.

INSOLUBLE MICRONIZED PARTICLES

The compositions of the present invention comprise from about 0.1% to about 20%, more preferably from about 0.5% to about 15%, and most preferably from about 2.5% to about 10% of micronized polymer particles, based on the weight of the total composition.

The term "insoluble", as used herein, means that the particles are essentially insoluble in the compositions of the present invention. In particular, the insoluble particles should have a solubility less than about 1 gram per 100 grams of composition at 25°C, preferably less than about 0.5 grams per 100 grams of composition at 25°C, and more preferably less than about 0.1 grams per 100 grams of composition at 25°C.

These micronized particles have a mean particle size diameter and particle size distribution such that they are below the tactile perception threshold of most users, and yet are not so small as to be ineffective for aiding in oil, dirt, and debris (e.g., make-up) removal. It is found herein that particles having a mean particle size diameter greater than about 75 microns are tactilely perceived during the cleansing process and it is important to minimize the amount of these larger particles in the compositions. Conversely, it is found that particles having a mean particle size diameter of less than about 1 to about 5 microns are generally less effective for providing a cleansing benefit. Without being limited by theory, it is believed that the insoluble cleansing particles should be of a size that is on the order of the thickness of the dirt, oil, or debris layer to be cleaned away. This layer is believed to be on the order of a few microns in thickness in most instances. Most conventional abrasive cleansers utilize particles typically having a particle size diameter in the 150-300 micron range, which is far larger than necessary for effective cleansing. Consequently, such products have the disadvantage of having an abrasive feel without necessarily improving cleansing performance beyond that achieved in the present invention.

It is therefore found in the present invention that the micronized particles should have a mean particle size diameter from about 1 to about 75 microns, more preferably from about 15 to about 60 microns, and most preferably from about 20 to about 50 microns, so as to provide effective cleansing without being tactilely perceptible.

Additionally, it is also recognized that mean particule size is not the only consideration that is important in determining the suitability of a particle for use herein. For example, even though a particle sample might have the "correct" average particle size diameter, the particle distribution should be such as to have a minimum percentage of the particles above the tactile threshold of above 75 microns. Therefore, the insoluble micronized particles of the present invention also have a particle size distribution such that greater than about 95% of the particles when formulated into the compositions have a particle size less than about 75 microns, preferably greater than about 97.5% of the particles have a particle size less than about 75 microns, more preferably greater than about 99% of the particles have a particle size less than about 75 microns, and most preferably greater than about 99.5% of the particles have a particle size less than about 75 microns.

The particle size of the micronized particles of the present invention can be measured using a variety of different techniques well-known to the formulation scientist of ordinary skill in the art, e.g. laser diffraction, microscopy, filtration, sedimentation, etc. In the present invention, a preferred method of determining particle size is the laser diffraction technique using a commercially available laser particle size analyzer. In the present invention the particle size measurements are determined using a Munhall Particle Size Analyser, Model PSA-32 (available from Munhall Corp.). A variety of solvents of various viscosity and polarity can be used to disperse the particles in the samples to be analyzed for size. Preferred solvents include water, hexanes, and isopropanol, with isopropanol being more preferred.

Particles having a wide range of shapes, surface characteristics, and hardness characteristics can be utilized herein provided the particle size requirements are met.

The water-insoluble, micronized particles of the present invention can be derived from a wide variety of materials including those derived from inorganic, organic, natural, and synthetic sources. Nonlimiting examples of these materials

include those selected from the group consisting of almond meal, alumina, aluminum oxide, aluminum silicate, apricot seed powder, attapulgite, barley flour, bismuth oxychloride, boron nitride, calcium carbonate, calicum phosphate, calcium pyrophosphate, calicum sulfate, cellulose, chalk, chitin, clay, corn cob meal, corn cob powder, corn flour, corn meal, corn starch, diatomaceous earth, dicalcium phosphate, dicalcium phosphate dihydrate, fullers earth, hydrated silica, hydroxyapatite, iron oxide, jojoba seed powder, kaolin, loofah, magneisum trisilicate, mica, microcrystalline cellulose, montmorillonite, oat bran, oat flour, oatmeal, peach pit powder, pecan shell powder, polybutylene, polyethylene, polyisobutylene, polymethylstyrene, polypropylene, polystyrene, polyurethane, nylon, teflon (i.e. polytetrafluoroethylene), polyhalogenated olefins, pumice rice bran, rye flour, sericite, silica, silk, sodium bicarbonate, soidum silicoaluminate, soy flour synthetic hectorite, talc, tin oxide, titanium dioxide, tricalcium phosphate, walnut shell powder, wheat bran, wheat flour, wheat starch, zirconium silicate, and mixtures thereof. Also useful are micronized particles made from mixed polymers (e.g., copolymers, terpolymers, etc.), such as polyethylene/polypropylene copolymer, polyethylene/pro- pylene/isobutylene copolymer, polyethylene/styrene copolymer, and the like. Typically, the polymeric and mixed polymeric particles are treated via an oxidation process to destroy impurities and the like. The polymeric and mixed polymeric particles can also optionally be crosslinked with a variety of common crosslinking agents, nonlimiting examples of which include butadiene, divinyl benzene, methylenebisacrylamide, allyl ethers of suscrose, allyl ethers of pentaerythritol, and mixtures thereof. Other examples of useful micronized particles include waxes and resins such as paraffins, camuba wax, ozekerite wax, candellila wax, urea-formaldehyde resins, and the like. When such waxes and resins are used herein it is important that these materials are solids at ambient and skin temperatures.

Among the preferred water-insoluble, micronized particulate materials useful herein are the synthetic polymeric particles selected from the group consisting of polybutylene, polyethylene, polyisobutylene, polymethylstyrene, polypropylene, polystyrene, polyurethane, nylon, teflon, and mixtures thereof.

Most preferred are polyethylene and polypropylene micronized particles, with the oxidized versions of these materials being especially preferred. Examples of commercially available particles useful herein include the

ACumistTM micronized polyethylene waxes available from Allied Signal (Morristown, NJ) available as the A, B, C, and D series in a variety of average particle sizes ranging from 5 microns to 60 microns. Preferred are the ACumistTM A-25, A-30, and A-45 oxidized polyethylene particles having a mean
5 particle size diameter of 25, 30, and 45 microns, respectively. Examples of commercially available polypropylene particles include the Propyltex series available from Micro Powders (Dartek).

WATER SOLUBLE OR DISPERSIBLE GELLING AGENT

The compositions of the present invention comprise from about 0.05% to
10 about 10%, more preferably from about 0.1% to about 5%, and most preferably from about 0.25% to about 2.5% of a water soluble or dispersible gelling agent. By "water soluble or dispersible" as used herein means that the gelling agents are soluble or dispersible in water at a level of at least about 0.25% by weight at 25°C. The gelling agent can be a single chemical compound as well as mixtures
15 of two or more chemical compounds.

Nonlimiting classes of water soluble or dispersible gelling agents include those selected from the group consisting of carboxylic acid polymers, crosslinked polyacrylate polymers, polyacrylamide polymers, polysaccharides, gums, vinyl ether/maleic anhydride copolymers, crosslinked poly(N-vinylpyrrolidones), and
20 mixtures thereof. See U.S. Patent No., 4,387,107, to Klein et al., issued June 7, 1983 and "Encyclopedia of Polymer and Thickeners for Cosmetics", R.Y. Lochhead and W.R. Fron, eds., Cosmetics & Toiletries, vol. 108, pp. 95-135 (May 1993), which list a variety of thickening or gelling agents, and which are incorporated herein by reference in its entirety.

25 Carboxylic Acid Polymers These polymers are crosslinked compounds containing one or more monomers derived from acrylic acid, substituted acrylic acids, and salts and esters of these acrylic acids and the substituted acrylic acids, wherein the crosslinking agent contains two or more carbon-carbon double bonds and is derived from a polyhydric alcohol. The preferred carboxylic
30 acid polymers are of two general types. The first type of polymer is a crosslinked homopolymer of an acrylic acid monomer or derivative thereof (e.g., wherein the acrylic acid has substituents on the two and three carbon positions independently selected from the group consisting of C₁₋₄ alkyl, -CN, -COOH, and mixtures thereof). The second type of polymer is a crosslinked copolymer
35 having a first monomer selected from the group consisting of an acrylic acid

monomer or derivative thereof (as just described in the previous sentence), a short chain alcohol (i.e. a C₁₋₄) acrylate ester monomer or derivative thereof (e.g., wherein the acrylic acid portion of the ester has substituents on the two and three carbon positions independently selected from the group consisting of C₁₋₄ alkyl, -CN, -COOH, and mixtures thereof), and mixtures thereof; and a second monomer which is a long chain alcohol (i.e. C₈₋₄₀) acrylate ester monomer or derivative thereof (e.g., wherein the acrylic acid portion of the ester has substituents on the two and three carbon positions independently selected from the group consisting of C₁₋₄ alkyl, -CN, -COOH, and mixtures thereof).
10 Combinations of these two types of polymers are also useful herein.

In the first type of crosslinked homopolymers the monomers are preferably selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, and mixtures thereof, with acrylic acid being most preferred. In the second type of crosslinked copolymers the acrylic acid monomer or derivative thereof is preferably selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, and mixtures thereof, with acrylic acid, methacrylic acid, and mixtures thereof being most preferred. The short chain alcohol acrylate ester monomer or derivative thereof is preferably selected from the group consisting of C₁₋₄ alcohol acrylate esters, C₁₋₄ alcohol methacrylate esters, C₁₋₄ alcohol ethacrylate esters, and mixtures thereof, with the C₁₋₄ alcohol acrylate esters, C₁₋₄ alcohol methacrylate esters, and mixtures thereof, being most preferred. The long chain alcohol acrylate ester monomer is selected from C₈₋₄₀ alkyl acrylate esters, with C₁₀₋₃₀ alkyl acrylate esters being preferred.

25 The crosslinking agent in both of these types of polymers is a polyalkenyl polyether of a polyhydric alcohol containing more than one alkenyl ether group per molecule, wherein the parent polyhydric alcohol contains at least 3 carbon atoms and at least 3 hydroxyl groups. Preferred crosslinkers are those selected from the group consisting of allyl ethers of sucrose and allyl ethers of pentaerythritol, and mixtures thereof. These polymers useful in the present invention are more fully described in U.S. Patent No. 5,087,445, to Haffey et al., issued February 11, 1992; U.S. Patent No. 4,509,949, to Huang et al., issued April 5, 1985; U.S. Patent No. 2,798,053, to Brown, issued July 2, 1957; which are incorporated by reference herein. See also, CTFA International Cosmetic

Ingredient Dictionary, fourth edition, 1991, pp. 12 and 80; which are also incorporated herein by reference in their entirety.

Examples of commercially available homopolymers of the first type useful herein include the carbomers, which are homopolymers of acrylic acid crosslinked with allyl ethers of sucrose or pentaerythritol. The carbomers are available as the Carbopol® 900 series from B.F. Goodrich. Examples of commercially available copolymers of the second type useful herein include copolymers of C₁₀₋₃₀ alkyl acrylates with one or more monomers of acrylic acid, methacrylic acid, or one of their short chain (i.e. C₁₋₄ alcohol) esters, wherein the crosslinking agent is an allyl ether of sucrose or pentaerythritol. These copolymers are known as acrylates/C10-30 alkyl acrylate crosspolymers and are commercially available as Carbopol® 1342, Pemulen TR-1, and Pemulen TR-2, from B.F. Goodrich. In other words, examples of carboxylic acid polymer thickeners useful herein are those selected from the group consisting of carbomers, acrylates/C10-C30 alkyl acrylate crosspolymers, and mixtures thereof.

Crosslinked Polyacrylate Polymers The crosslinked polyacrylate polymers useful as thickeners include both cationic and nonionic polymers, with the cationics being generally preferred. Examples of useful crosslinked nonionic polyacrylate polymers and crosslinked cationic polyacrylate polymers are those described in U.S. Patent 5,100,660, to Hawe et al., issued March 31, 1992; U.S. Patent 4,849,484, to Heard, issued July 18, 1989; U.S. Patent 4,835,206, to Farrar et al., issued May 30, 1989; U.S. Patent 4,628,078 to Glover et al. issued December 9, 1986; U.S. Patent 4,599,379 to Flesher et al. issued July 8, 1986; and EP 228,868, to Farrar et al., published July 15, 1987; all of which are incorporated by reference herein in their entirety.

The crosslinked polyacrylate polymers are high molecular weight materials that can be characterized by the general formula: (A)_l(B)_m(C)_n and comprise the monomer units (A)_l, (B)_m, and (C)_n, wherein (A) is a dialkylaminoalkyl acrylate monomer or its quaternary ammonium or acid addition salt, (B) is a dialkylaminoalkyl methacrylate monomer or its quaternary ammonium or acid addition salt, (C) is a monomer that is polymerizable with (A) or (B), for example a monomer having a carbon-carbon double bond or other such polymerizable functional group, l is an integer of 0 or greater, m is an integer of 0 or greater, n

is an integer of 0 or greater, but where either l or m, or both, must be 1 or greater.

The (C) monomer can be selected from any of the commonly used monomers. Nonlimiting examples of these monomers include ethylene, propylene, butylene, isobutylene, eicosene, maleic anhydride, acrylamide, methacrylamide, maleic acid, acrolein, cyclohexene, ethyl vinyl ether, and methyl vinyl ether. In the cationic polymers of the present invention, (C) is preferably acrylamide. The alkyl portions of the (A) and (B) monomers are short chain length alkyls such as C_1-C_8 , preferably C_1-C_5 , more preferably C_1-C_3 , and most preferably C_1-C_2 . When quaternized, the polymers are preferably quaternized with short chain alkyls, i.e., C_1-C_8 , preferably C_1-C_5 , more preferably C_1-C_3 , and most preferably C_1-C_2 . The acid addition salts refer to polymers having protonated amino groups. Acid addition salts can be performed through the use of halogen (e.g. chloride), acetic, phosphoric, nitric, citric, or other acids.

These (A)_l(B)_m(C)_n polymers also comprise a crosslinking agent, which is most typically a material containing two or more unsaturated functional groups. The crosslinking agent is reacted with the monomer units of the polymer and is incorporated into the polymer thereby forming links or covalent bonds between two or more individual polymer chains or between two or more sections of the same polymer chain. Nonlimiting examples of suitable crosslinking agents include those selected from the group consisting of methylenebisacrylamides, diallyldialkyl ammonium halides, polyalkenyl polyethers of polyhydric alcohols, allyl acrylates, vinyloxyalkylacrylates, and polyfunctional vinylidenes. Specific examples of crosslinking agents useful herein include those selected from the group consisting of methylenebisacrylamide, ethylene glycol di-(meth)acrylate, di-(meth)acrylamide, cyanomethylacrylate, vinyloxyethylacrylate, vinyloxyethylmethacrylate, allyl pentaerythritol, trimethylolpropane diallylether, allyl sucrose, butadiene, isoprene, divinyl benzene, divinyl naphthalene, ethyl vinyl ether, methyl vinyl ether, and allyl acrylate. Other crosslinkers include formaldehyde and glyoxal. Preferred for use herein as a crosslinking agent is methylenebisacrylamide.

Widely varying amounts of the crosslinking agent can be employed depending upon the properties desired in the final polymer, e.g. viscosifying effect. Without being limited by theory, it is believed that incorporation of a

crosslinking agent into these cationic polymers provides a material that is a more effective viscosifying agent without negatives such as stringiness and viscosity breakdown in the presence of electrolytes. The crosslinking agent, when present, can comprise from about 1 ppm to about 1000 ppm, preferably from about 5 ppm to about 750 ppm, more preferably from about 25 ppm to about 500 ppm, even more preferably from about 100 ppm to about 500 ppm, and most preferably from about 250 ppm to about about 500 ppm of the total weight of the polymer on a weight/weight basis.

The intrinsic viscosity of the crosslinked polymer, measured in one molar sodium chloride solution at 25 °C, is generally above 6, preferably from about 8 to about 14. The molecular weight (weight average) of the crosslinked polymers hereof is high, and is believed to typically be between about 1 million and about 30 million. The specific molecular weight is not critical and lower or higher weight average molecular weights can be used as long as the polymer retains its intended

viscosifying effects in water or other aqueous carriers of the compositions hereof. Preferably, a 1.0% solution of the polymer (on an actives basis) in deionized water will have a viscosity at 25 °C of at least about 20,000 cP, preferably at least about 30,000 cP, when measured at 20 RPM by a Brookfield RVT (Brookfield Engineering Laboratories, Inc. Stoughton, MA, USA).

These cationic polymers can be made by polymerization of an aqueous solution containing from about 20% to about 60%, generally from about 25% to about 40%, by weight monomer, in the presence of an initiator (usually redox or thermal) until the polymerization terminates. The crosslinking agent can also be added to the solution of the monomers to be polymerized, to incorporate it into the polymer. In the polymerization reactions, the temperature generally starts between about 0 ° and 95 °C. The polymerization can be conducted by forming a reverse phase dispersion of an aqueous phase of the monomers (and also any additional crosslinking agents) into a nonaqueous liquid, e.g. mineral oil, lanolin, isododecane, oleyl alcohol, and other volatile and nonvolatile esters, ethers, and alcohols, and the like.

All percentages describing the polymer in this section of the description herein are molar, unless otherwise specified. When the polymer contains (C) monomer, the molar proportion of (C) monomer, based on the total molar amount of (A), (B), and (C), can be from 0% to about 99%. The molar proportions of (A)

and (B) can each be from 0% to 100%. When acrylamide, is used as the (C) monomer, it will preferably be used at a level of from about 20% to about 99%, more preferably from about 50% to about 90%.

Where monomer (A) and (B) are both present, the ratio of monomer (A) to monomer (B) in the final polymer, on a molar basis, is preferably from about 99:5 to about 15:85, more preferably from about 80:20 to about 20:80. Alternatively, in another class of polymers, the ratio is from about 5:95 to about 50:50, preferably from about 5:95 to about 25:75.

In another alternative class of polymers, the ratio (A):(B) is from about 50:50 to about 85:15. Preferably the ratio (A):(B) is about 60:40 to about 85:15, most preferably about 75:25 to about 85:15.

Most preferred is where monomer (A) is not present and the ratio of monomer (B):monomer (C) is from about 30:70 to about 70:30, preferably from about 40:60 to about 60:40 and most preferably from about 45:55 to about 55:45.

Cationic polymers that are useful herein that are especially preferred are those conforming to the general structure $(A)_l(B)_m(C)_n$ wherein l is zero, (B) is methyl quaternized dimethylaminoethyl methacrylate, the ratio of (B):(C) is from about 45:55 to about 55:45, and the crosslinking agent is methylenebisacrylamide. An example of such a cationic polymer is one that is commercially available as a mineral oil dispersion (which can also include various dispersing aids such as PPG-1 trideceth-6) under the trademark Salcare[®] SC92 from Allied Colloids Ltd. (Norfolk, Virginia). This polymer has the proposed CTFA designation, "Polyquaternium 32 (and) Mineral Oil".

Other cationic polymers useful herein, are those not containing acrylamide or other (C) monomers, that is, n is zero. In these polymers the (A) and (B) monomer components are as described above. An especially preferred group of these non-acrylamide containing polymers is one in which l is also zero. In this instance the polymer is essentially a homopolymer of a dialkylaminoalkyl methacrylate monomer or its quaternary ammonium or acid addition salt. These dialkylaminoalkyl methacrylate polymers preferably contain a crosslinking agent as described above.

A cationic polymer, which is essentially a homopolymer, useful herein is one conforming to the general structure $(A)_l(B)_m(C)_n$ wherein l is zero, (B) is methyl quaternized dimethylaminoethyl methacrylate, n is zero, and the crosslinking agent is methylenebisacrylamide. An example of such a

homopolymer is commercially available as a mixture containing approximately 50% of the polymer, approximately 44% mineral oil, and approximately 6% PPG-1 trideceth-6 as a dispersing aid, from Allied Colloids Ltd, (Norfolk, VA) under the trademark Salcare® SC95. This polymer has recently been given the CTFA designation "Polyquaternium 37 (and) Mineral Oil (and) PPG-1 Trideceth-6".

Polyacrylamide Polymers Also useful herein are polyacrylamide polymers, especially non-ionic polyacrylamide polymers including substituted branched or unbranched polymers. These polymers can be formed from a variety of monomers including acrylamide and methacrylamide which are unsubstituted or substituted with one or two alkyl groups (preferably C₁ to C₅). Preferred are acrylate amide and methacrylate amide monomers in which the amide nitrogen is unsubstituted, or substituted with one or two C₁ to C₅ alkyl groups (preferably methyl, ethyl, or propyl), for example, acrylamide, methacrylamide, N-methacrylamide, N-methylmethacrylamide, N,N-dimethylmethacrylamide, N-isopropylacrylamide, N-isopropylmethacrylamide, and N,N-dimethylacrylamide. These polymers have a molecular weight greater than about 1,000,000 preferably greater than about 1,500,000 and range up to about 30,000,000. Most preferred among these polyacrylamide polymers is the non-ionic polymer given the CTFA designation polyacrylamide and isoparaffin and laureth-7, available under the Tradename Sepigel 305 from Seppic Corporation (Fairfield, NJ).

Other polyacrylamide polymers useful herein include multi-block copolymers of acrylamides and substituted acrylamides with acrylic acids and substituted acrylic acids. Commercially available examples of these multi-block copolymers include Hypan SR150H, SS500V, SS500W, SSSA100H, from Lipo Chemicals, Inc., (Patterson, NJ).

Polysaccharides A wide variety of polysaccharides are useful herein. By "polysaccharides" are meant gelling agents containing a backbone of repeating sugar (i.e. carbohydrate) units. Nonlimiting examples of polysaccharide gelling agents include those selected from the group consisting of cellulose, carboxymethyl hydroxyethylcellulose, cellulose acetate propionate carboxylate, hydroxyethylcellulose, hydroxyethyl ethylcellulose, hydroxypropylcellulose, hydroxypropyl methylcellulose, methyl hydroxyethylcellulose, microcrystalline cellulose, sodium cellulose sulfate, and mixtures thereof. Also useful herein are the alkyl substituted celluloses. In these polymers, the hydroxy groups of the

cellulose polymer is hydroxyalkylated (preferably hydroxyethylated or hydroxypropylated) to form a hydroxyalkylated cellulose which is then further modified with a C10-C30 straight chain or branched chain alkyl group through an ether linkage. Typically these polymers are ethers of C10-C30 straight or branched chain alcohols with hydroxyalkylcelluloses. Examples of alkyl groups useful herein include those selected from the group consisting of stearyl, isostearyl, lauryl, myristyl, cetyl, isocetyl, cocoyl (i.e. alkyl groups derived from the alcohols of coconut oil), palmityl, oleyl, linoleyl, linolenyl, ricinoleyl, behenyl, and mixtures thereof.

- Preferred among the alkyl hydroxyalkyl cellulose ethers is the material given the CTFA designation cetyl hydroxyethylcellulose, which is the ether of cetyl alcohol and hydroxyethylcellulose. This material is sold under the tradename Natrosol® CS Plus from Aqualon Corporation. Other useful polysaccharides include scleroglucans comprising a linear chain of (1->3) linked glucose units with a (1->6) linked glucose every three units, a commercially available example of which is Clearogel™ CS11 from Michel Mercier Products Inc. (Mountainside, NJ).

Gums Other gelling agents useful herein include materials which are primarily derived from natural sources. Nonlimiting examples of these gelling agent gums include materials selected from the group consisting of acacia, agar, algin, alginic acid, ammonium alginate, amylopectin, bentonite, calcium alginate, calcium carrageenan, carnitine, carrageenan, corn starch, dextrin, gelatin, gellan gum, guar gum, guar hydroxypropyltrimonium chloride, hectorite, hyaluronic acid, hydrated silica, hydroxypropyl chitosan, hydroxypropyl guar, karaya gum, kelp, locust bean gum, magnesium aluminum silicate, magnesium silicate, magnesium trisilicate, montmorillonite, natto gum, potassium alginate, potassium carrageenan, propylene glycol alginate, sclerotium gum, sodium carboxymethyl dextran, sodium carrageenan, sodium polyacrylate starch, sodium silicoaluminate, starch/acrylates/acrylamide copolymer, tragacanth gum, xanthan gum, and mixtures thereof.

Crosslinked Vinyl Ether/Maleic Anhydride Copolymers Other gelling agents useful herein include crosslinked copolymers of alkyl vinyl ethers and maleic anhydride. In these copolymers the vinyl ethers are represented by the formula $R-O-CH=CH_2$ wherein R is a C1-C6 alkyl group, preferably R is methyl. Preferred crosslinking agents are C4-C20 dienes, preferably C6 to C16 dienes,

and most preferably C8 to C12 dienes. A particularly preferred copolymer is one formed from methyl vinyl ether and maleic anhydride wherein the copolymer has been crosslinked with decadiene, and wherein the polymer when diluted as a 0.5% aqueous solution at pH 7 at 25°C has a viscosity of 50,000-70,000 cps when measured using a Brookfield RTV viscometer, spindle #7 at 10 rpm. This copolymer has the CTFA designation PVM/MA decadiene crosspolymer and is commercially available as Stabileze™ 06 from International Specialty Products (Wayne NJ).

Crosslinked poly(N-vinylpyrrolidones) Crosslinked polyvinyl(N-pyrrolidones) useful herein as gelling agents include those described in U.S. Patent No. 5,139,770, to Shih et al, issued August 18, 1992, and U.S. Patent No. 5,073,614, to Shih et al., issued December 17, 1991, both patents of which are incorporated by reference herein in their entirety. These gelling agents typically contain from about 0.25% to about 1% by weight of a crosslinking agent selected from the group

consisting of divinyl ethers and diallyl ethers of terminal diols containing from about 2 to about 12 carbon atoms, divinyl ethers and diallyl ethers of polyethylene glycols containing from about 2 to about 600 units, dienes having from about 6 to about 20 carbon atoms, divinyl benzene, vinyl and allyl ethers of pentaerythritol, and the like. Typically, these gelling agents have a viscosity from about 25,000 cps to about 40,000 cps when measured as a 5% aqueous solution at 25°C using a Brookfield RVT viscometer with Spindle #6 at 10 rpm. Commercially available examples of these polymers include ACP-1120, ACP-1179, and ACP-1180, available from International Specialty Products (Wayne, NJ).

Water

The compositions of the present invention comprise from about 20% to about 99.85%, more preferably from about 50% to about 95%, and most preferably from about 70% to about 90% of water.

ADDITIONAL COMPONENTS

The compositions of the present invention can comprise a wide range of additional components. Some of the preferred components include the following:

SURFACTANTS

The compositions of the present invention can further comprise from about 0.05% to about 40%, preferably about 0.1% to about 20%, more preferably from about 0.5% to about 15%, and most preferably from about 1% to about 10% of a surfactant selected from the group consisting of nonionic surfactants, anionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, and mixtures thereof.

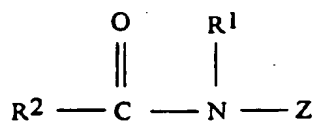
Suitable surfactants for use in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by Allured Publishing Corporation; U.S. Patent No. 5,151,210, to Steuri et al., issued September 29, 1992; U.S. Patent No. 5,151,209, to McCall et al., issued September 29, 1992; U.S. Patent No. 5,120,532, to Wells et al., issued June 9, 1992; U.S. Patent No. 5,011,681, to Ciotti et al., issued April 30, 1991; U.S. Patent No. 4,788,006, to Bolich, Jr. et al., issued November 29, 1988; U.S. Patent No. 4,741,855, to Grote et al., issued May 3, 1988; U.S. Patent No. 4,704,272, to Oh et al., issued November 3, 1987; U.S. Patent No. 4,557,853, to Collins, issued December 10, 1985; U.S. Patent No. 4,421,769, to Dixon et al., issued December 20, 1983; and U.S. Patent No. 3,755,560, to Dickert et al., issued August 28, 1973; each of these documents being incorporated herein by reference in its entirety. It is to be understood that even though the term surfactant is used herein in this section to describe these materials, that the term is not meant to exclude materials which also have emulsification properties, as it is well known to one skilled in the art that a surfactant can also have emulsification properties and vice versa.

Among the nonionic surfactants that are useful herein are those that can be broadly defined as condensation products of long chain alcohols, e.g. C8-30 alcohols, with sugar or starch polymers, i.e., glycosides. These compounds can be represented by the formula $(S)_n-O-R$ wherein S is a sugar moiety such as glucose, fructose, mannose, and galactose; n is an integer of from about 1 to about 1000, and R is a C8-30 alkyl group. Examples of long chain alcohols from which the alkyl group can be derived include decyl alcohol, cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol, oleyl alcohol, and the like. Preferred examples of these surfactants include those wherein S is a glucose moiety, R is a C8-20 alkyl group, and n is an integer of from about 1 to about 9. Commercially available examples of these surfactants include decyl

polyglucoside (available as APG 325 CS from Henkel) and lauryl polyglucoside (available as APG 600CS and 625 CS from Henkel).

Other useful nonionic surfactants include the condensation products of alkylene oxides with fatty acids (i.e. alkylene oxide esters of fatty acids). These materials have the general formula $\text{RCO}(\text{X})_n\text{OH}$ wherein R is a C10-30 alkyl group, X is $-\text{OCH}_2\text{CH}_2-$ (i.e. derived from ethylene glycol or oxide) or $-\text{OCH}_2\text{CHCH}_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 1 to about 100. Other nonionic surfactants are the condensation products of alkylene oxides with 2 moles of fatty acids (i.e. alkylene oxide diesters of fatty acids). These materials have the general formula $\text{RCO}(\text{X})_n\text{OOCR}$ wherein R is a C10-30 alkyl group, X is $-\text{OCH}_2\text{CH}_2-$ (i.e. derived from ethylene glycol or oxide) or $-\text{OCH}_2\text{CHCH}_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 1 to about 100. Other nonionic surfactants are the condensation products of alkylene oxides with fatty alcohols (i.e. alkylene oxide ethers of fatty alcohols). These materials have the general formula $\text{R}(\text{X})_n\text{OR}'$ wherein R is a C10-30 alkyl group, X is $-\text{OCH}_2\text{CH}_2-$ (i.e. derived from ethylene glycol or oxide) or $-\text{OCH}_2\text{CHCH}_3-$ (i.e. derived from propylene glycol or oxide), and n is an integer from about 1 to about 100 and R' is H or a C10-30 alkyl group. Still other nonionic surfactants are the condensation products of alkylene oxides with both fatty acids and fatty alcohols [i.e. wherein the polyalkylene oxide portion is esterified on one end with a fatty acid and etherified (i.e. connected via an ether linkage) on the other end with a fatty alcohol]. These materials have the general formula $\text{RCO}(\text{X})_n\text{OR}'$ wherein R and R' are C10-30 alkyl groups, X is $-\text{OCH}_2\text{CH}_2-$ (i.e. derived from ethylene glycol or oxide) or $-\text{OCH}_2\text{CHCH}_3-$ (derived from propylene glycol or oxide), and n is an integer from about 1 to about 100. Nonlimiting examples of these alkylene oxide derived nonionic surfactants include ceteth-1, ceteth-2, ceteth-6, ceteth-10, ceteth-12, ceteraeth-2, cetareth-6, cetareth-10, cetareth-12, steareth-1, steareth-2, steareth-6, steareth-10, steareth-12, PEG-2 stearate, PEG-4 stearate, PEG-6 stearate, PEG-10 stearate, PEG-12 stearate, PEG-20 glyceryl stearate, PEG-80 glyceryl tallowate, PPG-10 glyceryl stearate, PEG-30 glyceryl cocoate, PEG-80 glyceryl cocoate, PEG-200 glyceryl tallowate, PEG-8 dilaurate, PEG-10 distearate, and mixtures thereof.

Still other useful nonionic surfactants include polyhydroxy fatty acid amide surfactants corresponding to the structural formula:



wherein: R¹ is H, C₁-C₄ alkyl, 2-hydroxyethyl, 2-hydroxy-propyl, preferably C₁-C₄ alkyl, more preferably methyl or ethyl, most preferably methyl; R² is C₅-C₃₁ alkyl or alkenyl, preferably C₇-C₁₉ alkyl or alkenyl, more preferably C₉-C₁₇ alkyl or alkenyl, most preferably C₁₁-C₁₅ alkyl or alkenyl; and Z is a polyhydroxyhydrocarbonyl moiety having a linear hydrocarbonyl chain with a least 3 hydroxyls directly connected to the chain, or an alkoxylated derivative (preferably ethoxylated or propoxylated) thereof. Z preferably is a sugar moiety selected from the group consisting of glucose, fructose, maltose, lactose, galactose, mannose, xylose, and mixtures thereof. An especially preferred surfactant corresponding to the above structure is coconut alkyl N-methyl glucoside amide (i.e., wherein the R²CO- moiety is derived from coconut oil fatty acids). Processes for making compositions containing polyhydroxy fatty acid amides are disclosed, for example, in G.B. Patent Specification 809,060, published February 18, 1959, by Thomas Hedley & Co., Ltd.; U.S. Patent No. 2,965,576, to E.R. Wilson, issued December 20, 1960; U.S. Patent No. 2,703,798, to A.M. Schwartz, issued March 8, 1955; and U.S. Patent No. 1,985,424, to Piggott, issued December 25, 1934; which are incorporated herein by reference in their entirety.

A wide variety of anionic surfactants are useful herein. See, e.g., U.S. Patent No. 3,929,678, to Laughlin et al., issued December 30, 1975, which is incorporated herein by reference in its entirety. Nonlimiting examples of anionic surfactants include the alkoyl isethionates, and the alkyl and alkyl ether sulfates. The alkoyl isethionates typically have the formula RCO-OCH₂CH₂SO₃M wherein R is alkyl or alkenyl of from about 10 to about 30 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium and triethanolamine. Nonlimiting examples of these isethionates include those alkoyl isethionates selected from the group consisting of ammonium cocoyl isethionate, sodium cocoyl isethionate, sodium lauroyl isethionate, sodium stearoyl isethionate, and mixtures thereof. Preferred for used herein are ammonium cocoyl isethionate, sodium cocoyl isethionate, and mixtures thereof.

The alkyl and alkyl ether sulfates typically have the respective formulae ROSO₃M and RO(C₂H₄O)_xSO₃M, where in R is alkyl or alkenyl of from about

10 to about 30 carbon atoms, x is from about 1 to about 10, and M is a water-soluble cation such as ammonium, sodium, potassium and triethanolamine. Another suitable class of anionic surfactants are the water-soluble salts of the organic, sulfuric acid reaction products of the general
 5 formula:

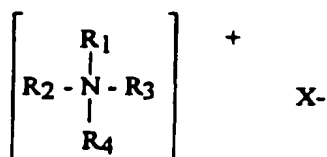


wherein R_1 is chosen from the group consisting of a straight or branched chain, saturated aliphatic hydrocarbon radical having from about 8 to about 24, preferably about 12 to about 18, carbon atoms; and M is a cation. Still other
 10 anionic synthetic surfactants include the class designated as succinamates, olefin sulfonates having about 12 to about 24 carbon atoms, and b-alkyloxy alkane sulfonates. Especially preferred sulfates for use herein include sodium lauryl sulfate and ammonium lauryl sulfate.

Other anionic materials useful herein are soaps (i.e. alkali metal salts, e.g., sodium or potassium salts) of fatty acids, typically having from about 8 to
 15 about 24 carbon atoms, preferably from about 10 to about 20 carbon atoms. The fatty acids used in making the soaps can be obtained from natural sources such as, for instance, plant or animal-derived glycerides (e.g., palm oil, coconut oil, soybean oil, castor oil, tallow, lard, etc.) The fatty acids can also be
 20 synthetically prepared. Soaps are described in more detail in U.S. Patent No. 4,557,853, cited above.

Nonlimiting examples of cationic surfactants useful herein include cationic ammonium salts such as those having the formula:

25



wherein R_1 is selected from an alkyl group having from about 12 to about 22 carbon atoms, or aromatic, aryl or alkaryl groups having from about 12 to about 22 carbon atoms; R_2 , R_3 , and R_4 are independently selected from hydrogen, an alkyl group having from about 1 to about 22 carbon atoms, or aromatic, aryl or alkaryl groups having from about 12 to about 22 carbon atoms; and X is an anion selected from chloride, bromide, iodide, acetate, phosphate, nitrate, sulfate, methyl sulfate, ethyl sulfate, tosylate, lactate, citrate, glycolate, and mixtures thereof. Additionally, the alkyl groups can also contain ether linkages, or hydroxy or amino group substituents (e.g., the alkyl groups can contain polyethylene glycol and polypropylene glycol moieties). More preferably, R_1 is an alkyl group having from about 12 to about 22 carbon atoms; R_2 is selected from H or an alkyl group having from about 1 to about 22 carbon atoms; R_3 and R_4 are independently selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described in the previous paragraph. Most preferably, R_1 is an alkyl group having from about 12 to about 22 carbon atoms; R_2 , R_3 , and R_4 are selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described previously.

Alternatively, other useful cationic surfactants include amino-amides, wherein in the above structure R_1 is alternatively $R_5CO-(CH_2)_n$ -, wherein R_5 is an alkyl group having from about 12 to about 22 carbon atoms, and n is an integer from about 2 to about 6, more preferably from about 2 to about 4, and most preferably from about 2 to about 3. Nonlimiting examples of these cationic emulsifiers include stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

Nonlimiting examples of quaternary ammonium salt cationic surfactants include those selected from the group consisting of cetyl ammonium chloride, cetyl ammonium bromide, lauryl ammonium chloride, lauryl ammonium bromide, stearyl ammonium chloride, stearyl ammonium bromide, cetyl dimethyl ammonium chloride, cetyl dimethyl ammonium bromide, lauryl dimethyl ammonium chloride, lauryl dimethyl ammonium bromide, stearyl dimethyl ammonium chloride, stearyl dimethyl ammonium bromide, cetyl trimethyl ammonium chloride, cetyl trimethyl ammonium bromide, lauryl trimethyl

ammonium chloride, lauryl trimethyl ammonium bromide, stearyl trimethyl ammonium chloride, stearyl trimethyl ammonium bromide, lauryl dimethyl ammonium chloride, stearyl dimethyl cetyl ditallow dimethyl ammonium chloride, dicetyl ammonium chloride, dicetyl ammonium bromide, dilauryl ammonium chloride, dilauryl ammonium bromide, distearyl ammonium chloride, distearyl ammonium bromide, dicetyl methyl ammonium chloride, dicetyl methyl ammonium bromide, dilauryl methyl ammonium chloride, dilauryl methyl ammonium bromide, distearyl methyl ammonium chloride, distearyl dimethyl ammonium chloride, distearyl methyl ammonium bromide, and mixtures thereof.

Additional quaternary ammonium salts include those wherein the C12 to C22 alkyl carbon chain is derived from a tallow fatty acid or from a coconut fatty acid. The term "tallow" refers to an alkyl group derived from tallow fatty acids (usually hydrogenated tallow fatty acids), which generally have mixtures of alkyl chains in the C16 to C18 range. The term "coconut" refers to an alkyl group derived from a coconut fatty acid, which generally have mixtures of alkyl chains in the C12 to C14 range. Examples of quaternary ammonium salts derived from these tallow and coconut sources include ditallow dimethyl ammonium chloride, ditallow dimethyl ammonium methyl sulfate, di(hydrogenated tallow) dimethyl ammonium chloride, di(hydrogenated tallow) dimethyl ammonium acetate, ditallow dipropyl ammonium phosphate, ditallow dimethyl ammonium nitrate, di(coconutalkyl)dimethyl ammonium chloride, di(coconutalkyl)dimethyl ammonium bromide, tallow ammonium chloride, coconut ammonium chloride, stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

More preferred cationic surfactants are those selected from the group consisting of dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

Most

preferred cationic emulsifiers are those selected from the group consisting of dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, and mixtures thereof.

5 Examples of amphoteric and zwitterionic surfactants which can be used in the compositions of the present invention are those which are broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight or branched chain and wherein one of the aliphatic substituents contains from about 8 to about 22 carbon atoms (preferably C₈ -
10 C₁₈) and one contains an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Examples are alkyl imino acetates, and iminodialkanoates and aminoalkanoates of the formulas $RN(CH_2)_mCO_2M$ and $RNH(CH_2)_mCO_2M$ wherein m is from 1 to 4, R is a C₈-C₂₂ alkyl or alkenyl, and M is H, alkali metal, alkaline earth metal
15 ammonium, or alkanolammonium. Also included are imidazolinium and ammonium derivatives. Specific examples of suitable amphoteric surfactants include sodium 3-dodecyl-aminopropionate, sodium 3-dodecylaminopropane sulfonate, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Patent 2,658,072
20 which is incorporated herein by reference in its entirety; N-higher alkyl aspartic acids such as those produced according to the teaching of U.S. Patent 2,438,091 which is incorporated herein by reference in its entirety; and the products sold under the trade name "Miranol" and described in U.S. Patent 2,528,378, which is incorporated herein by reference in its entirety. Other
25 examples of useful amphoteric include phosphates, such as coamidopropyl PG-dimonium chloride phosphate (commercially available as Monaquat PTC, from Mona Corp.).

Especially useful herein as amphoteric or zwitterionic surfactants are the betaines. Examples of betaines include the higher alkyl betaines, such as coco
30 dimethyl carboxymethyl betaine, lauryl dimethyl carboxymethyl betaine, lauryl dimethyl alphacarboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, cetyl dimethyl betaine (available as Lonzaine 16SP from Lonza Corp.), lauryl bis-(2-hydroxyethyl) carboxymethyl betaine, stearyl bis-(2-hydroxypropyl) carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, lauryl
35 bis-(2-hydroxypropyl)alpha-carboxyethyl betaine, coco dimethyl sulfopropyl

betaine, stearyl dimethyl sulfopropyl betaine, lauryl dimethyl sulfoethyl betaine, lauryl bis-(2-hydroxyethyl) sulfopropyl betaine, and amidobetaines and amidosulfobetaines (wherein the $\text{RCONH}(\text{CH}_2)_3$ radical is attached to the nitrogen atom of the betaine), oleyl betaine (available as amphoteric Velvetex
5 OLB-50 from Henkel), and cocamidopropyl betaine (available as Velvetex BK-35 and BA-35 from Henkel).

Other highly useful amphoteric and zwitterionic surfactants include the sultaines and hydroxysultaines such as cocamidopropyl hydroxysultaine (available as Mirataine CBS from Rhone-Poulenc), and the alkanoyl
10 sarcosinates corresponding to the formula $\text{RCON}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CO}_2\text{M}$ wherein R is alkyl or alkenyl of about 10 to about 20 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium and trialkanolamine (e.g., triethanolamine), a preferred example of which is sodium lauroyl sarcosinate.

15 Among the surfactants described above, preferred for use herein are those selected from the group consisting of sodium cetearyl sulfate, sodium lauryl sulfate, sodium lauryl sarcosinate, sodium cocoyl isethionate, coamidopropyl betaine, sodium laureth sulfate, cetyl dimethyl betaine, ammonium lauryl sulfate, sodium tallow soap, sodium coconut soap, ceteth-10, steareth-21, steareth-2,
20 ceteth-2, glyceryl stearate, glucose amides, dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, and mixtures thereof.

EMOLLIENTS

The compositions of the present invention can also comprise from 0.1% to
25 about 50%, preferably from about 0.1% to about 20%, and most preferably from about 0.5% to about 10% of an emollient. Without being limited by theory, it is believed that these emollient materials provide a cleansing benefit by acting as a solvent to help dissolve oils and other oily debris during the cleansing process. The term emollient, as used herein is intended to include conventional
30 lipid materials (e.g., fats, waxes, and other water insoluble materials), polar lipids (e.g., lipid materials which have been hydrophylically modified to render them more water soluble), silicones, hydrocarbons, and a wide variety of solvent materials.

A wide variety of emollient materials are suitable for use in the
35 compositions of the present invention. Examples of conventional emollients

include C8-30 alkyl esters of C8-30 carboxylic acids; C1-6 diol monoesters and diesters of C8-30 carboxylic acids; monoglycerides, diglycerides, and triglycerides of C8-30 carboxylic acids; cholesterol esters of C8-30 carboxylic acids, cholesterol, and hydrocarbons. Examples of these materials include

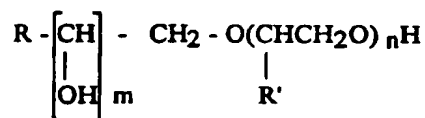
5 diisopropyl adipate, isopropyl myristate, isopropyl palmitate, ethylhexyl palmitate, isodecyl neopentanoate, C12-15 alcohols benzoate, diethylhexyl maleate, PPG-14 butyl ether, PPG-2 myristyl ether propionate, cetyl ricinoleate, cholesterol stearate, cholesterol isostearate, cholesterol acetate, jojoba oil, cocoa butter, shea butter, lanolin, lanolin esters, mineral oil, petrolatum, and straight

10 and branched hydrocarbons having from about 16 to about 30 carbon atoms. Also useful are straight and branched chain alcohols having from about 10 to about 30 carbon atoms, nonlimiting examples of which include stearyl alcohol, isostearyl alcohol, behenyl alcohol, cetyl alcohol, isocetyl alcohol, and mixtures thereof. Examples of other suitable materials are disclosed in U.S. Patent No.

15 4,919,934, to Deckner et al., issued April 24, 1990; which is incorporated herein by reference in its entirety.

Also useful as emollients are material such as alkoxyated ethers and diethers. The alkoxyated ethers useful herein can be described by the following general formula:

20

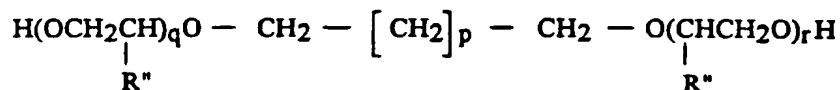


25 wherein R is selected from the group consisting of H and C1-C30 straight chain or branched chain alkyl, m is an integer from 0 to about 6, R' is selected from the group consisting of methyl and ethyl, and n is an integer from about 3 to about 30.

30 Preferably R is selected from the group consisting of C2-C25 straight chain or branched alkyl, m is an integer from 0 to about 2, R' is methyl, and n is an integer from about 5 to about 25. More preferably R is selected from the group consisting of C2-C20 straight chain or branched chain alkyl, m is an integer from 0 to about 1, R' is methyl, and n is an integer from about 10 to about 20.

Nonlimiting examples of alkoxylated ethers useful herein include PPG-10 butyl ether, PPG-11 butyl ether, PPG-12 butyl ether, PPG-13 butyl ether, PPG-14 butyl ether, PPG-15 butyl ether, PPG-16 butyl ether, PPG-17 butyl ether, PPG-18 butyl ether, PPG-19 butyl ether, PPG-20 butyl ether, PPG-22 butyl ether, PPG-24 butyl ether, PPG-30 butyl ether, PPG-11 stearyl ether, PPG-15 stearyl ether, PPG-10 oleyl ether, PPG-7 lauryl ether, PPG-30 isocetyl ether, PPG-10 glyceryl ether, PPG-15 glyceryl ether, PPG-10 butyleneglycol ether, PPG-15 butylene glycol ether, PPG-27 glyceryl ether, PPG-30 cetyl ether, PPG-28 cetyl ether, PPG-10 cetyl ether, PPG-10 hexylene glycol ether, PPG-15 hexylene glycol ether, PPG-10 1,2,6-hexanetriol ether, PPG-15 1,2,6-hexanetriol ether, and mixtures thereof. Most preferred are PPG-14 butyl ether (available as Fluid AP from Union Carbide Corp.) and PPG-15 stearyl ether (available under the tradename Arlamol E from ICI Americas Corporation).

Also useful herein are alkoxylated diethers. These compounds can be represented by the general formula:



20

wherein each R'' is selected from the group consisting of methyl and ethyl, p is an integer from about 1 to about 6, and each q and r are independently selected so that their sum is an integer from about 3 to about 30. Preferably R'' is methyl, p is an integer from about 2 to about 4, and each q and r are independently selected so that their sum is an integer from about 5 to about 25. More preferably R'' is methyl, p is an integer from 2 to about 4, and each q and r are independently selected so that their sum is an integer from about 10 to about 20.

Nonlimiting examples of alkoxylated diethers useful herein include those selected from the group consisting of PPG-10 1,4-butanediol diether, PPG-12 1,4-butanediol diether, PPG-14 1,4-butanediol diether, PPG-2 butanediol diether, PPG-10 1,6-hexanediol diether, PPG-12 1,6-hexanediol diether, PPG-14 hexanediol diether, PPG-20 hexanediol diether, and mixtures thereof. Preferred are those selected from the group consisting of PPG-10 1,4-butanediol diether, PPG-12 1,4-butanediol diether, PPG-10 1,6-hexandiols diether, and PPG-12

hexanediol diether, and mixtures thereof. More preferred is PPG-10 1,4-butanediol diether. This compound is commercially available under the tradename Macol 57 from PPG/Mazer Corporation.

Also useful as emollients are the so-called "polar lipids" which contain
5 hydrophilic moieties such as hydroxy groups carbonyl groups and ether linkages. Preferred classes of these polar lipids include C10-20 alcohol monosorbitan esters, C10-20 alcohol sorbitan diesters, C10-20 alcohol sorbitan triesters, C10-20 alcohol sucrose monoesters, C10-20 alcohol sucrose diesters, C10-20 alcohol sucrose triesters, and C10-20 fatty alcohol esters of C2-C6
10 2-hydroxy acids. Nonlimiting examples of these polar lipids are sorbitan diisostearate, sorbitan dioleate, sorbitan distearate, sorbitan isosotearate, sorbitan laurate, sorbitan oleate, sorbitan palmitate, sorbitan sesquioleate, sorbitan sesquistearte, sorbitan stearate, sorbitan triiostearte, sorbitan trioleate, sorbitan tristeate, sucrose cocoate, sucrodilaurate, sucrose distearate, sucrose
15 laurate, sucrose myristate, sucrose oleate, sucrose palmitate, sucrose ricinoleate, sucrose stearate, sucrose tribehenate, sucrose tristearate, myristyl lactate, stearyl lactate, isostearyl lactate, cetyl lactate, palmityl lactate, cocoyl lactate, and mixtures thereof. Other polar lipids are the C10-20 alkyl pidolates (i.e. pyrrolidone carboxylate esters, examples of which are myristyl pidolate, cetyl pidolate, lauryl pidolate, and stearyl pidolate). Yet other polar lipids are
20 alkyl C1-3 esters of panthenol such as panthenyl triacetate (which is the triacetyl ester of panthenol). Especially preferred among the polar lipids are isostearyl lactate (available as Pationic IL, from RITA Corp), sorbitan laurate (available as Arlacel 20 from ICI Americas), lauryl pyrrolidone carboxylic acid (available as lauryl pidolate from UCIB Corp.), panthenyl triacetate (available as D-panthenyl triacetate from Induchem), and mixtures thereof.

Also useful are silicones including nonvolatile silicones such as dimethicone copolyol; dimethylpolysiloxane; diethylpolysiloxane; high molecular weight dimethicone (average molecular weight from about 200,000 to about
30 1,000,000 and, preferably, from about 300,000 to about 600,000) which can have various end-terminating groups such as hydroxyl, lower C₁-C₃ alkyl, lower C₁-C₃ alkoxy and the like; mixed C₁-C₃ alkyl polysiloxane (e.g., methylethylpolysiloxane); phenyl dimethicone and other aryl dimethicones; dimethiconol; fluorosilicones; and mixtures thereof.

Preferred among the nonvolatile silicones are those selected from the group consisting of dimethicone copolyol, dimethylpolysiloxane, diethylpolysiloxane, high molecular weight dimethicone, mixed C₁-C₃₀ alkyl polysiloxane, phenyl dimethicone, dimethiconol, and mixtures thereof. More preferred are non-volatile silicones selected from dimethicone, dimethiconol, mixed C₁-C₃₀ alkyl polysiloxane, and mixtures thereof. Especially preferred is dimethiconol which is a dimethyl silicone polymer terminated with hydroxyl groups. Dimethiconol is available as Q2-1401 Fluid, a solution of 13 percent ultra-high-viscosity dimethiconol in volatile cyclomethicone fluid as a carrier; as Q2-1403 Fluid, a solution of ultra-high-viscosity dimethiconol fluid in dimethicone (both sold by Dow Corning Corporation); and as other custom blends (e.g. 10% dimethiconol in dimethicone). Nonlimiting examples of silicones useful herein are described in U.S. Patent No. 5,011,681, to Ciotti et al., issued April 30, 1991, which has already been incorporated by reference.

Among the emollients preferred are those selected from the group consisting of mineral oil, petrolatum, cholesterol, dimethicone, dimethiconol, diisopropyl adipate, isopropyl myristate, myristyl myristate, cetyl ricinoleate, sorbitan distearte, sorbitan dilaurate, sorbitan stearate, sorbitan laurate, sucrose laurate, sucrose dilaurate, sodium isostearyl lactylate, lauryl pidolate, sorbitan stearate, stearyl acohol, cetyl alcohol, behenyl alcohol, PPG-14 butyl ether, PPG-15 stearyl ether, and mixtures thereof.

Additional Components

The compositions of the present invention can comprise a wide range of additional components. The CTFA Cosmetic Ingredient Handbook, Second Edition, 1992, which is incorporated by reference herein in its entirety, describes a wide variety of nonlimiting cosmetic and pharamceutical ingredients commonly used in the skin care industry, which are suitable for use in the compositions of the present invention. Nonlimiting examples of functional classes of ingredients are described at page 537 of this reference. Examples of these functional classes include: absorbents, anti-acne agents, anticaking agents, antifoaming agents, antimicrobial agents, antioxidants, binders, biological additives, buffering agents, bulking agents, chelating agents, chemical additives, colorants, cosmetic astringents, cosmetic biocides, denaturants, drug astringents, external analgesics, film formers, fragrance components, humectants, opacifying agents, pH adjusters, preservativ s, propellants, reducing agents, skin bleaching ag nts,

skin-conditioning agents (humectants, miscellaneous, and occlusive), sunscreen agents, and ultraviolet light absorbers. Examples of other functional classes of materials useful herein that are well known to one of ordinary skill in the art include emulsifiers, solubilizing agents, sequestrants, keratolytics, retinoids, and the like.

Nonlimiting examples of these additional components cited in the CTFA Cosmetic Ingredient Handbook, as well as other materials useful herein, include the following: vitamins and derivatives thereof (e.g. tocopherol, tocopherol acetate, retinoic acid, retinol, retinoids, and the like); sunscreens; antioxidants; anti-microbial agents; preservatives; emulsifiers; polyethyleneglycols and polypropyleneglycols; polymers for aiding the film-forming properties and substantivity of the composition (such as a copolymer of eicosene and vinyl pyrrolidone, an example of which is available from GAF Chemical Corporation as Ganex® V-220); preservatives for maintaining the antimicrobial integrity of the compositions; anti-acne medicaments (e.g., resorcinol, sulfur, salicylic acid, erythromycin, zinc, benzoyl peroxide, and the like); skin bleaching (or lightening) agents including but not limited to hydroquinone, kojic acid; antioxidants; chelators and sequestrants; and aesthetic components such as fragrances, pigments, colorings, essential oils, skin sensates, astringents, skin soothing agents, skin healing agents and the like, nonlimiting examples of these aesthetic components include panthenol and derivatives (e.g. ethyl panthenol), aloe vera, pantothenic acid and its derivatives, clove oil, menthol, camphor, eucalyptus oil, eugenol, menthyl lactate, witch hazel distillate, allantoin, bisabolol, dipotassium glycyrrhizinate and the like; and skin conditioning agents such as urea and glycerol, and also the propoxylated glycerols described in U.S. Patent No. 4,976,953, to Orr et al., issued December 11, 1990, which is incorporated by reference herein in its entirety. Preferred levels of skin conditioning agents such as glycerol, urea, and propoxylated glycerols range from about 0.1% to about 10%.

In a preferred composition of the present invention, the compositions comprise from about 0.1% to about 10% of a material selected from the group consisting of salicylic acid, glycolic acid, lactic acid, aloe vera, panthenol, pantothenic acid, clove oil, menthol, camphor, eucalyptus oil, eugenol, menthyl lactate, retinol, retinoic acid, azelaic acid, witch hazel distillate, allantoin, bisabolol, and mixtures thereof. Methods For Personal Cleansing

The compositions of the present invention are useful for cleansing the skin or hair. Typically, a suitable or effective amount of the cleansing composition is applied to the skin or hair to be cleansed. Alternatively, a suitable amount of the cleansing composition can be applied via intermediate application to a washcloth, a sponge, pad, cotton ball or other application device. If desired the area to be cleansed can be premoistened with water. It has been found that the compositions of the present invention can be combined with water during the cleansing process or used alone. The product can be removed after use either by rinsing the product with water, or simply wiping off the product with a tissue, cotton ball, etc. Generally an effective amount of product to be used will depend upon the needs and usage habits of the individual. Because these compositions are essentially non-abrasive, they can be used frequently such as on a daily basis or more than once a day for each cleansing, without undue irritation. Typical amounts of the present compositions useful for cleansing range from about 0.5 mg/cm² to about 25 mg/cm² of skin surface area to be cleansed.

EXAMPLES

The following examples further describe and demonstrate embodiments within the scope of the present invention. The examples are given solely for the purpose of illustration and are not to be construed as limitations of the present invention, as many variations thereof are possible without departing from the spirit and scope of the invention.

Ingredients are identified by chemical or CTFA name.

EXAMPLE 1

Cleanser

A cleanser is prepared by combining the following ingredients using conventional mixing techniques.

<u>Ingredients</u>	<u>Weight Percent</u>
Water	QS 100
Carbomer ¹	0.35
Triethanolamine	0.35
Polyethylene Particles ²	4.00
DMDM Hydantoin (and) Iodopropynyl	

30

Butylcarbamate ³	0.10
Fragrance	0.10

1 Available as Carbopol® 954 from B.F. Goodrich.

5 2 Oxidized Polyethylene Particles having a mean particle size diameter of 45 microns, available as Acumist A-45 from Allied Signal Corp.

3 Available as Glydant Plus from Lonza Corp.

10 In a suitable vessel the carbomer and water are mixed to disperse the carbomer. The triethanolamine is next added with stirring to neutralize the carbomer. The remaining ingredients are next added with stirring.

The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin.

15 Alternatively, the above composition is prepared by replacing the polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following materials: polybutylene, polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

20

EXAMPLE 2

Cleanser

A cleanser is prepared by combining the following ingredients using conventional mixing techniques.

25	<u>Ingredients</u>	<u>Weight Percent</u>
	Water	QS 100
	Polyethylene Particles ¹	4.00
	Carbomer ²	0.65
	Disodium EDTA	0.10
30	Sodium Hydroxide	0.12
	Dimethicone Copolyol	0.10
	Dimethicone	1.00
	DMDM Hydantoin (and) Iodopropynyl	
	Butylcarbamate ³	0.10

35

1 Oxidized Polyethylene Particles having a mean particle size diameter of 45
microns, available as Acumist A-45 from Allied Signal Corp.

2 Available as Carbopol® 980 from B.F. Goodrich.

3 Available as Glydant Plus from Lonza.

5

In a suitable vessel the carbomer and water are mixed with stirring to
disperse the carbomer. The triethanolamine is next added with stirring. The
remaining ingredients are next added with stirring.

10 The resulting cleanser exhibits low skin abrasion and is useful for
cleansing the skin.

Alternatively, the above composition is prepared by replacing the
polyethylene particles with particles of equivalent mean particle size or with
particles of other mean particle sizes in the range from about 1 micron to about
75 microns, selected from one or more of the following materials: polybutylene,
15 polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane,
nylon, and teflon.

EXAMPLE 3

Cleanser

20 A cleanser is prepared by combining the following ingredients using
conventional mixing techniques.

<u>Ingredients</u>	<u>Weight Percent</u>
Water	QS 100
Polyquaternium 37 (and) Mineral Oil	
25 (and) Trideceth-6 ¹	1.50
Polyethylene Particles ²	2.00
DMDM Hydantoin (and) Iodopropynyl	
Butylcarbamate ³	0.10

30 1 Available as Salcare® SC95 from Allied Colloids (Norfolk, VA).

2 Oxidized Polyethylene Particles having a mean particle size diameter of 45
microns, available as Acumist A-45 from Allied Signal Corp. Micronized

3 Available as Glydant Plus from Lonza.

In a suitable vessel the water and polyquaternium 37 (and) mineral oil (and) trideceth-6 are combined with stirring. Next the polyethylene particles and DMDM hydantoin (and) iodopropynyl butylcarbamate are added with mixing.

The resulting cleanser exhibits low skin abrasion and is useful for
5 cleansing the skin.

Alternatively, the above composition is prepared by replacing the polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following materials: polybutylene,
10 polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

EXAMPLE 4

Cleanser

15 A cleanser is prepared by combining the following ingredients using conventional mixing techniques.

	<u>Ingredients</u>	<u>Weight Percent</u>
	Water	QS 100
	Glycerin	3.00
20	Polyethylene Particles ¹	2.00
	Polyethylene Particles ²	2.00
	Distearyl Dimethyl Ammonium	
	Chloride	1.50
	Urea	0.50
25	Steareth-21	0.50
	Steareth-2	0.25
	Fragrance	0.15
	Polysaccharide Gum	0.25
	Disodium EDTA	0.01
30	DMDM Hydantoin (and) Iodopropynyl	
	Butylcarbamate ³	0.10

¹ Oxidized Polyethylene Particles having a mean particle size diameter of 25 microns, available as Acumist A-25 from Allied Signal Corp.

2 Oxidized Polyethylene Particles having a mean particle size diameter of 45 microns, available as Acumist A-45 from Allied Signal Corp.

3 Available as Glydant Plus from Lonza.

5 In a suitable vessel the water, glycerin, polysaccharide gum, and disodium EDTA are mixed and heated to 75-80°C with stirring. Next the distearyl dimethyl ammonium chloride, the steareth-2, and steareth-21, are added while continuing to heat and stir. The resulting mixture is cooled with stirring to 45°C and the urea, fragrance, and DMDM hydantoin (and)
10 iodopropynyl butylcarbamate are added. The mixture is cooled to room temperature with stirring at which time the polyethylene particles are mixed in.

The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin.

Alternatively, the above composition is prepared by replacing the
15 polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following materials: polybutylene, polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

20 EXAMPLE 5

Cleanser

A cleanser is prepared by combining the following ingredients using conventional mixing techniques.

25	<u>Ingredients</u>	<u>Weight Percent</u>
	Water	QS 100
	Glycerin	3.00
	Polyethylene Particles ¹	4.00
	Glucose Amides	2.56
30	Sorbitan Stearate	2.00
	Cetyl Alcohol	0.50
	Fragrance	0.50
	Phenoxyethanol	0.40
	Polyquaternium-10	0.20
35	Potassium Hydroxide	0.20

Acrylates/C10-30 Alkyl Acrylate Cross

	Polymer	0.20
	Methylparaben	0.10
	Stearic Acid	0.10
5	Propylparaben	0.10
	Tetrasodium EDTA	0.10

- 1 Oxidized Polyethylene Particles having a mean particle size diameter of 25
10 microns, available as Acumist A-25 from Allied Signal Corp.

In a suitable vessel the water, glycerin, glucose amides, polyquaternium-10, methylparaben, acrylates/C10-30 alkyl acrylates crosspolymer, and tetrasodium EDTA are mixed and heated to 75-80°C with stirring. In a separate
15 vessel the sorbitan stearate, stearic acid, propylparaben, and cetyl alcohol are heated to 75-80°C with stirring to form an oil phase. This oil phase is then emulsified into the water-containing mixture using a homogenizing mill. Next, the potassium hydroxide is added to neutralize the emulsion which is then cooled with stirring to 45°C, at which time the phenoxyethanol and fragrance are
20 added. The emulsion is cooled to room temperature with stirring at which time the polyethylene particles are mixed in.

The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin.

Alternatively, the above composition is prepared by replacing the
25 polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following materials: polybutylene, polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

30

EXAMPLE 6**Cleanser**

A cleanser is prepared by combining the following ingredients using
35 conventional mixing techniques.

	<u>Ingredients</u>	<u>Weight Percent</u>
	Water	QS 100
	Cetyl Betaine	2.00
	Sodium Alkyl Sulfate	1.00
5	PPG-14 Butyl Ether	3.25
	Glycerin	3.00
	Stearyl Alcohol	2.88
	Polyethylene Particles ¹	2.00
	Polyethylene Particles ²	2.00
10	Salicylic Acid	2.00
	Distearyl Dimethyl Ammonium Chloride	1.50
	Cetyl Alcohol	0.80
	Urea	0.50
15	Steareth-21	0.50
	Behenyl Alcohol	0.32
	PPG-30	0.25
	Steareth-2	0.25
	Fragrance	0.15
20	Polysaccharide Gum	0.15
	Disodium EDTA	0.01

¹ Oxidized Polyethylene Particles having a mean particle size diameter of 25 microns, available as Acumist A-25 from Allied Signal Corp.

25 ² Oxidized Polyethylene Particles having a mean particle size diameter of 45 microns, available as Acumist A-45 from Allied Signal Corp.

In a suitable vessel the water, glycerin, and disodium EDTA are mixed and heated to 75-80°C with stirring. In a separate vessel the PPG-14 butyl ether, and the salicylic acid are heated to 75-80°C with stirring to form an oil phase. Next the stearyl alcohol, cetyl alcohol, and the behenyl alcohol are added to this oil phase while continuing to heat with stirring. Next the distearyl dimethyl ammonium chloride, the steareth-2, and steareth-21, are added to the oil phase while still continuing to heat and stir. This oil phase is then emulsified into the water-containing mixture using a homogenizing mill. The resulting

emulsion is cooled with stirring to 45°C and the urea and fragrance are added. The emulsion is cooled to room temperature with stirring at which time the sodium alkyl sulfate and the cetyl betaine are mixed in, followed by the polyethylene particles.

- 5 The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin.

Alternatively, the above composition is prepared by replacing the polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about
10 75 microns, selected from one or more of the following materials: polybutylene, polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

15

EXAMPLE 7**Non-Rinsing Cleanser**

A non-rinsing cleanser is prepared by combining the following ingredients using conventional mixing techniques.

	<u>Ingredients</u>	<u>Weight Percent</u>
20	Water	QS 100
	Mineral Oil	5.00
	Polyethylene Particles ¹	4.00
	Isopropyl Palmitate	3.00
	Cetearyl Alcohol	2.00
25	PEG-10 Castor Oil	2.00
	Sodium Cetearyl Sulfate	1.00
	Glycerol Stearate	0.25
	Acrylamide/Sodium Acrylate Copolymer	0.25
30	Dimethicone	0.20
	Phenoxyethanol	0.40
	Methylparaben	0.10
	Propylparaben	0.10

¹ Oxidized Polyethylene Particles having a mean particle size diameter of 25 microns, available as Acumist A-25 from Allied Signal Corp.

In a suitable vessel the water, acrylamide/sodium acrylate copolymer, glyceryl stearate, sodium cetearyl sulfate, and methylparaben are mixed and heated to 75-80°C with stirring. In a separate vessel the isopropyl palmitate, cetearyl alcohol, PEG-10 castor oil, dimethicone, and propylparaben are heated to 75-80°C with stirring to form an oil phase. This oil phase is then emulsified into the water-containing mixture using a homogenizing mill. The mixture is cooled to 45°C with stirring and the phenoxyethanol is mixed in. The resulting emulsion is cooled to room temperature at which time the polyethylene particles are stirred in.

The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin. This cleanser can be used without water to cleanse the skin using a pad, cotton ball, tissue, or the like.

Alternatively, the above composition is prepared by replacing the polyethylene particles with particles of equivalent mean particle size or with particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following material: polybutylene, polyisobutylene, polymethylstyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

EXAMPLE 8

Cleanser

A cleanser is prepared by combining the following ingredients using conventional mixing techniques.

	<u>Ingredients</u>	<u>Weight Percent</u>
	Water	QS 100
	Magnesium Aluminum Silicate ¹	1.00
30	Polyethylene Beads ²	4.00
	Potassium Hydroxide	2.00
	Propylene Glycol	2.50
	Sodium Lauryl Sulfate	2.00
	Oleic Acid	9.00
35	DMDM Hydantoin (and) Iodopropynyl	

Butylcarbamate³

0.10

¹ Available as Veegum HS from RT Vanderbilt (Norwalk, CT).

² Oxidized Polyethylene Particles having a mean particle size diameter of 25
5 microns, available as Acumist A-25 from Allied Signal Corp.

³ Available as Glydant Plus from Lonza.

In a suitable vessel the water and magnesium aluminum silicate are heated with stirring to 75°C. Next the potassium hydroxide, propylene glycol,
10 and sodium lauryl sulfate are added with heating and stirring. In a separate vessel the oleic acid is heated until melted and then added with mixing to the remaining ingredients. The mixture is cooled with stirring and the polyethylene particles and the DMDM hydantoin (and) iodopropynyl butylcarbamate are added with stirring.

15 The resulting cleanser exhibits low skin abrasion and is useful for cleansing the skin. This cleanser can be used without water to cleanse the skin using a pad, cotton ball, tissue, or the like.

Alternatively, the above composition is prepared by replacing the polyethylene particles with particles of equivalent mean particle size or with
20 particles of other mean particle sizes in the range from about 1 micron to about 75 microns, selected from one or more of the following materials: polybutylene, polyisobutylene, polymethystyrene, polypropylene, polystyrene, polyurethane, nylon, and teflon.

What is claimed is:

1. A nonabrasive personal cleansing aqueous gel composition comprising:
 - (a) from 0.1% to 20% of insoluble particles having a mean particle size diameter from 1 micron to 75 microns, with greater than 95% of said particles in said composition having a diameter less than 75 microns,
 - (b) from 0.05% to 10% of a water soluble or dispersible gelling agent, and
 - (d) from 20% to 99.85% water.
2. A composition according to claim 1 wherein said particles have a mean particle size diameter from 5 microns to 60 microns, with greater than 95% of said particles in said composition having a diameter less than 75 microns, and preferably wherein said particles have a mean particle size diameter from 20 microns to 50 microns, with greater than 95% of said particles in said composition having a diameter less than 75 microns.
3. A composition according to Claim 2 wherein said particles are selected from the group consisting of polybutylene, polyethylene, polyisobutylene, polymethylstyrene, polypropylene, polystyrene, polyurethane, nylon, teflon, and mixtures thereof, preferably wherein said particles are selected from the group consisting of polyethylene, polypropylene, and mixtures thereof, and more preferably wherein said particles are selected from the group consisting of oxidized polyethylene, oxidized polypropylene, and mixtures thereof.
4. A composition according to Claim 3 wherein said water soluble or dispersible gelling agent is selected from the group consisting of carboxylic acid polymers, crosslinked polyacrylate polymers, polyacrylamide polymers, polysaccharides, gums, crosslinked vinyl ethyler/maleic anhydride copolymers, cellulosic thickeners, crosslinked poly(N-vinylpyrrolidones), and mixtures thereof, preferably wherein said water soluble or dispersible gelling agent comprises from about 0.1% to about 5% of said composition, and more preferably wherein said water soluble or dispersible gelling agent comprises from 0.25% to 2.5% of said composition.

5. A composition according to Claim 4 which further comprises from 0.05% to 40% of a surfactant selected from the group consisting of nonionic surfactants, anionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, and mixtures thereof, preferably wherein said surfactant is selected from the group consisting of sodium cetearyl sulfate, sodium lauryl sulfate, sodium lauryl sarcosinate, sodium cocoyl isethionate, coamidopropyl betaine, sodium laureth sulfate, cetyl dimethyl betaine, ammonium lauryl sulfate, sodium tallow soap, sodium coconut soap, ceteth-10, steareth-21, steareth-2, ceteth-2, glyceryl stearate, glucose amides, dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, and mixtures thereof.
6. A composition according to Claim 5 which further comprises from 0.1% to 50% of an emollient.
7. A composition according to Claim 6 wherein said emollient is selected from the group consisting of mineral oil, petrolatum, cholesterol, dimethicone, dimethiconol, diisopropyl adipate, isopropyl myristate, myristyl myristate, cetyl ricinoleate, sorbitan disteate, sorbitan dilaurate, sorbitan stearate, sorbitan laurate, sucrose laurate, sucrose dilaurate, sodium isostearyl lactylate, lauryl pidolate, sorbitan stearate, stearyl alcohol, cetyl alcohol, behenyl alcohol, PPG-14 butyl ether, PPG-15 stearyl ether, and mixtures thereof.
8. A composition according to Claims 5, 6, or 7 which further comprises from 0.1% to 10% of a material selected from the group consisting of salicylic acid, lactic acid, glycolic acid, aloe vera, panthenol, pantothenic acid, clove oil, menthol, camphor, euclyptus oil, eugenol, menthyl lactate, retinol, retinoic acid, azelaic acid, witch hazel distillate, allantoin, bisabolol, and mixtures thereof.
9. A composition according to Claims 5, 6, 7, or 8 which further comprises from 0.1% to 10% of a skin conditioner selected from the group consisting of glycerin, urea, propoxylated glycerol, and mixtures thereof.

10. A method for cleansing skin comprising applying to the skin from 0.5 mg/cm² to 25 mg/cm² of the composition of any of claims 1 through 9.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 95/10486

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/48 A61K7/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 105 657 (BEECHAM) 18 April 1984 see examples 8-11 ---	1-7,9,10
X	GB,A,2 008 943 (BEECHAM) 13 June 1979 see page 1, column 2, line 78 - line 104; claims ---	1-4,6,7
X	US,A,4 309 411 (TODA ET AL.) 5 January 1982 see claims 12,13; figures 1,2; examples ---	1-3,8,9
X	EP,A,0 336 900 (WARNER-LAMBERT CO.) 11 October 1989 see page 5, line 65 - page 6, line 1; example 4 -----	1-4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

27 November 1995

Date of mailing of the international search report

10. 01. 96

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+ 31-70) 340-3016

Authorized officer

Loiselet-Taisne, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 95/10486

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-105657	18-04-84	AU-B- 564042	30-07-87
		AU-B- 1975083	05-04-84
		CA-A- 1236404	10-05-88
		DE-A- 3382566	02-07-92
		JP-A- 59089610	23-05-84

GB-A-2008943	13-06-79	BE-A- 872246	23-05-79
		CA-A- 1106289	04-08-81
		NL-A- 7811559	29-05-79
		SE-B- 444644	28-04-86
		SE-A- 7812087	27-05-79
US-A- 4294823	13-10-81		

US-A-4309411	05-01-82	JP-C- 1386227	26-06-87
		JP-A- 55127313	02-10-80
		JP-B- 60021567	28-05-85

EP-A-336900	11-10-89	US-A- 4992476	12-02-91
		AU-B- 3232589	05-10-89
		JP-A- 2015021	18-01-90
		PT-B- 90198	30-06-94

THIS PAGE BLANK (USPTO)